Journal of the Society of Arts.

FRIDAY, JANUARY 18, 1861.

EXAMINATIONS.—LOCAL BOARDS.

Those Secretaries of Institutions who have not already forwarded Lists of their Local Educational Boards are requested to do so as soon as possible, not omitting to specify the Chairman and Secretary.

Copies of the Programme of Examinations for the present year may be obtained by members of any of these Boards on application to the Secretary of the Society of Arts. In this will be found full instructions for their guidance in making the necessary arrangements for co-operating with the Society of Arts, but should there be any point requiring explanation, the Secretary will be happy to afford it.

SIXTH ORDINARY MEETING.

WEDNESDAY, JANUARY 16, 1861.

The Sixth Ordinary Meeting of the One Hundred and Seventh Session, was held on Wednesday, the 16th inst., T. King Chambers, Esq., M.D., Member of the Council, in the chair.

The following gentlemen were proposed for election as members of the Society:—

Aldridge, R. W.	The Avenue, Denmark-street, Camberwell, S.
Allen, Thomas	Upton-cottage, Macclesfield.
Beale, James	11, Wellington-place, Cork
Boden, Henry	Ednaston-lodge, near Derby.
Borries, Christian	Newcastle-on-Tyne.
Breillat, E.	Murdoch-villa, Coburg-road, Montpelier, Bristol.
Cammell, Charles	Norton-hall, near Sheffield.
Chesterfield, Earl of	3, Grosvenor-square, W., and Bretby-park, Burton-on-Trent.
Clayton, Thomas	South Stainley, Ripley, Yorks.
Cocker, Joseph R.	Belle-vue, Hathersage, near Sheffield.
Cooper, Major William Cooper	Toddington Manor, Dunstable, Beds.
Dickinson, Peter	Holland-house, Vassall-road, Brixton, S.
Euing, William	209, West George-street, Glasgow.
Hamilton, Edward Wm. Terrick	32, Upper Brook-street, W.
Harris, Henry	Heaton-hall, near Bradford.
Heaps, John Knowles	Leeds.
Henderson, John	Hungerford Wharf, Strand, W.C.
Higginbotham, Samuel	Glasgow.
Howard, Edward C.	Brinnington-hall, Stockport.
Hunt, Thomas	Bridge-street, Banbury.
Kay, John Robinson	Walmesley-house, Summerseal, near Manchester.
Lyons, M.	143, Suffolk-street, Birmingham.
Mitchell, C.	Low Walker, near Newcastle-on-Tyne.
Morrison, Robert	Ouseburn Engine Works, Newcastle-on-Tyne.
Muspratt, Frederic	Woodend Chemical Works, Runcorn Gap, Warrington.
Napier, Robert	West Shandon, Glasgow.
Neville, Samuel	Ellison Flint Glass Works, Gateshead-on-Tyne.
Oakes, John	Riddings-house, near Alfreton.
Pierpoint, Benjamin	St. Austin's, Warrington.
Platt, John	Oldham.
Radcliffe, John	Lower-house Mills, Oldham.
Richardson, E. Junr.	3, Lovaine-place, Newcastle-on-Tyne.
Robb, Alexander	79, St, Martin's-lane, W.C.
Smith, Samuel	6, Upper Westbourne-terrace, Hyde-park, W.
Sowerby, John	Ellison Flint Glass Works, Gateshead-on-Tyne.
Straker, John	Willington-house, Durham.
Turner, Robert	32, Grey-street, Newcastle-on-Tyne.
Wotherspoon, William	46, Dunlop-street, Glasgow.
Young, J. W.	64, Gordon-street, Glasgow.

The following candidates were balloted for and duly elected members of the Society:—

Bacon, Jacob Perkins	69, Fleet-street, E.C.
Brown, Henry	Market-street, Bradford.
Cheere, Robert	31, York-terrace, Regent's-park, N.W.
Clifton, Edward Norton	47, Upper Harley-street, W.
Jeffery, Wm. S.	9, Regent-street, S.W.
Morley, Henry	4, Frederick-villas, East Brixton, S.
Pike, Ebenezer	Cork.
Roberts, Joseph	7, Old Jewry, E.C.
Whichcord, John	16, Walbrook, E.C.

The following Institution has been received into Union since the last announcement:—

Carlisle, Young Men's Christian Association.

The Paper read was—

RECENT EXPERIMENTAL INQUIRIES INTO THE NATURE AND ACTION OF ALCOHOLS AS FOOD.

BY EDWARD SMITH, M.D., LL.B., F.R.S, ASSISTANT-PHYSICIAN TO THE HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, BROMPTON, &c.

I have undertaken to ask you to consider to-night the subject of alcohols, in the belief that no other is more worthy of your attention, for it is one in which all are interested, both as individuals and as members of a community. The moral, physical, intellectual, and monetary character of a nation is as certainly bound up with it as is the health, domestic comfort, and social status of its individual inhabitants; and perhaps there is no other single subject of which this could be so truthfully said.

I am also induced to take this step because I feel that there is much error in the opinions held both by those who support and those who vehemently oppose the use of alcohols, which it is desirable to correct so far as increasing knowledge may enable us to do so; and, as a further plea, I may mention that science is now setting aside some of the views which she has hitherto promulgated, and is adopting others which seem by recent experiments and inquiries to be better founded.

I am, however, fearful lest you should have become so familiar with the subject and so impressed with the irreconcileable opinions which you have heard expressed, that it may no longer interest you; but although it is thousands of years since its evils were first known and protested against, and throughout intervening ages it has had great nations as its admirers, and equally great communities as its pledged objectors, it does not show that the subject

is now exhausted, but only how much truth lies on both sides.

In taking it up in a simple spirit of truth, and without any known bias in either practice or pledge, to draw us unduly in either direction, I trust that we may find that a new consideration of the action of a substance of the most general use, upon which an incredible amount of money is yearly spent, both by the poor and the rich, which has potent powers most liable to abuse, and about which there is so old standing a difference of opinion, may not be without advantage. The subject is however as vast as it is important, and has so many ramifications which should interest us, that it is necessary *in limine* to make a selection, and to lay down defined limits for the evening's discussion. There are many here who look upon it in a national, others in a moral, and others in a social point of view, and who could doubtless treat it in these respects much more efficiently than I could; but there is one question which clearly underlies all others—one which must guide all others, and to which I have given a prolonged attention, which may be sufficiently discussed in the brief space of time allotted to us, viz., the nature and the mode of action of alcohols. If we could arrive at correct and extensive views upon this question we should certainly have greater unanimity of opinion in reference to the larger bearings of this subject—unanimity and truth where there are at least seeming diversity and error—an object which is the end of all inquiries.

The plan, therefore, which I propose to adopt, is to consider, in as few words as possible, the three prime articles of belief amongst scientific men, and then to append a few subsidiary observations which naturally associate themselves with the principal subjects.

The three statements for discussion are the following:—

1. That the presence of alcohol in the many members of the class of alcohols gives a common character to the whole, and is *the* efficient agent in their action.
2. That alcohol is consumed in the body, and produces heat.
3. That alcohol lessens the waste of the body.

These will embrace the leading points, both in the scientific and the popular knowledge of the subject.

1. The assertion that alcohol gives a common character to and is the sole efficient agent in the members in the class of alcohols:—

In expressing my disbelief in this first statement, I do so with confidence, for I can appeal to the common practice of mankind—to facts with which every one is familiar, and which, however much they may have been disregarded, disprove the assertion in the most infallible manner. The practice of mankind is instinctive, and therefore based upon truth, whilst the researches and reasonings of men need correction, and hence the former is the test by which the truthfulness of the latter must be judged.

If alcohol be the efficient agent in alcohols, why is it that, after so much experience, we have not been induced to use pure alcohol alone, and dilute it to the extent to which we dilute strong spirits, or in which we find it in wines and ales? This would surely be the readiest and the most rational procedure. Why is it found that new whisky is avoided by our northern neighbours, who are the best judges and most unsatisfied consumers of that liquid? Why are new wines discarded by the intelligent members of the neighbouring clubs in Pall-mall, seeing that they contain more alcohol than is found in older samples? Why does the hot whisky, strong in alcohol, which on the banks of the Ohio is sold at a few cents. per gallon, make the poor Red Indian (to whom it is bartered) frantically and furiously mad? Or, why will the raw whisky and the rough strong common wines sold in this country, give headache and general derangement of the system in the morning, when greater quantities of what are called purer spirits and wines might have been drunk with impunity? Why do we, in selecting our wines, watch the oil trickling on the sides of the wine-glass, and carefully seek for a fragrant, full-bodied aroma, which gives us more pleasure than even the tasting of the wine? Why does the price of wine differ so greatly, apart from the amount of alcohol which it contains, and apart also from the supply of the wine or the year of its age? Why are the wines of certain vintages preferred to others? and, in general, why are vintage wines preferred to mixed wines? These are matters of hourly observation and of universal practice, and there must be valid reasons for them.

Why, again, do we object so strongly to the rough raw spirit which is found in the Cape wines, and why the objection which has recently been taken by the French Government to the use of inferior spirit in the manufacture of Cognac? Why, indeed, do we use the term "inferior" spirit at all if the amount of alcohol be the only test of its value? Why, again, do some persons prefer spirits, others wines, and others ales; and why is there so infinite a variety of tastes on such minute matters? The instinctive experience of mankind has pointed out the quantities of each which will produce an effect upon the consciousness, for whether it be one glass of spirits and water, or one to two pints of ale, or half a bottle of wine, it will contain the same quantity of alcohol, and hence these are recognised as the proper limits of a moderate drinker, but why the diversity in the choice, if the alcohol be the efficient agent?

Then, again, see the amount of popular knowledge as to the effects of these various substances, all of which, when taken in the usual dose, contain the same amount of alcohol. Let us take men who drink these fluids, but who are sober men, and can we not distinguish the gin-drinker from the beer-drinker? The former is a pale, haggard, emaciated, feeble, morose, creature, whilst the latter is a man of full habit, florid, and more genial. Then where shall we range the brandy and rum drinkers? It is well known that in the West Indies the decanter of fine old rum is kept upon the side-board, and any one entering the room may take a quantity diluted with water at any time of the day; and notwithstanding this he looks healthy and is hearty; but let a man, thus accustomed to rum, begin to drink brandy, and within a few weeks his friends perceive the change, from his altered aspect and manner. Why is rum the grog of our sailors, and of those of all civilised nations? Surely in America at least whisky can be made most abundantly and at a less price than rum; and although rum was introduced into the Navy as being the cheapest spirit, it is probably not so now. What would be the effect upon our jolly, care-nothing, muscular sailors, if they were supplied with gin instead of rum, but to remove from them the hearty aspect of the ale-drinker, and give them the appearance and strength of the emaciated wretches who haunt the corners of the streets?

We not only select, and that with the greatest nicety, the various kinds of alcohols which we prefer, but the effect upon the feelings, the aspect and the health of the system differs with each member of this class. This is popular knowledge and practice—based upon instinct rather than upon reason; for if you ask for the reason, the only answer you can obtain is the instinctive one that "I like it best," or "it agrees best with me." It is not a question of how much alcohol is contained in these substances (except within certain limits), and yet on scientific grounds the rational distinction should be the amount of alcohol.

Neither is it altogether a question of taste, for if it were so we might turn to a body of gentlemen who are not reputed to care much about the taste of the agents which they employ, and ask why the medical practitioner does not give alcohol alone in the cases in which he judges it right to administer some member of this class. We know that he does not do so, but on the contrary selects with the greatest care that member of the class, which in his judgment is especially fitted for his case and will direct you as to even the kind of ale which you should take, and attach great importance as to whether you must drink port or

sherry wine, when each will contain, as he knows, the same amount of alcohol. In doing this he is partly guided by his instinct, for it is commonly alleged that medical men recommend that which they like themselves, but it is in other parts based upon reason, for he has seen different effects follow their use.

In asking you to reflect upon these various questions may I not assume that it is clear to every one, almost without consideration, that men do recognize the fact that there are other important agents in alcohols than alcohol; and is it not probable that alcohol has attracted the chief attention of both scientific and non-scientific persons, because of its power to affect the consciousness, whilst the effects of other agents are less prominent? It is also true that whilst alcohol may be readily obtained from alcohols, and its presence proved by certain physical properties, the other agents have been but very imperfectly studied, and at this day are classed under the general expressions of volatile oils and ethers.

That alcohol itself is not a simple and uniform fluid, is known to every distiller, for whilst the finest is produced early, and is used in the manufacture of scents, and the next quality is, or should be employed in the manufacture of brandy and gin, and used in medicine, the product of the last hours of distillation is consigned to the makers of varnish. It is true that the first samples contain more alcohol than the latter ones, but that is not the real distinction. The flavour varies with the hour of distillation, and at the end a large quantity of fusil oil and free acid is found mixed with the alcohol as it leaves the still. The effects of the fusil oil have not been determined, but it is known to be one of the substances found in all raw, rough spirits, which produce headache.

Hence there is a practical but unexpressed belief that, however important alcohol may be in the various members of the class of alcohols, there are other substances associated with it of no less importance.

This quite accords with the results of my own experiments upon the human system, for I have shown that alcohol alone, and each member of the class of alcohols, has its own degree and even kind of action.

The plan which I have adopted in these inquiries has differed from that pursued by my predecessors, in the following particulars:—In former inquiries the substance was taken in doses unusually large or unusually frequent, and with various kinds of food, also at different periods of the day, and with varying degrees of exertion, and hence it was very difficult to dissociate the influence of the other agents from that under inquiry, and even yet more difficult to obtain a standard with which to compare the results. With a view to avoid these difficulties, I selected the morning time, before breakfast, for the inquiry, when the system was very sensitive, and when no influence of food existed; and by making the experiments in perfect rest, it appeared that all interfering agencies were removed, and the effect of the alcohol was perfectly isolated. We also obtained a correct standard with which to compare the result, viz., the amount of chemical change which occurred immediately before the fluid was taken. Hence, as the methods of inquiry have differed so greatly, it cannot surprise if the results obtained should differ also. The direction of my inquiries has been that of the effect of alcohols over the respiratory functions, and the diagrams which are on the walls exhibit the results at which I have arrived.

ALCOHOL itself, when taken in doses of 1½oz. (a small wine-glass full), diluted with 6oz. of cold water, almost always increased the amount of carbonic acid evolved, but only in a very moderate degree; the greatest increase varied from about half a grain to one grain per minute, but the average increase during the inquiry was from one-eighth to one-half a grain per minute. When a small dose (half an ounce) was repeated every quarter of an hour, the effect was more uniform.

RUM had a similar but a more decided action, for in one experiment there was an increase of two grains of carbonic acid per minute upon one of the persons; when repeated in small doses its action very much resembled that of alcohol.

BRANDY and GIN, in nearly every experiment, lessened the amount of carbonic acid expired, and the latter to the remarkable extent of nearly 1¾ grains per minute in one experiment. The diagrams exhibit much variation during each inquiry, and upon different persons—but the general results were as just stated.

WHISKY varied much in its action, notwithstanding that in this, as in all other inquiries, we drank alcohols of more than average quantity. Generally, it lessened the respiratory changes, but with a very manifest tendency to return to, or to exceed, the latter quantity.

WINES, when taken in doses of 3oz., without water, produced but little effect, but commonly there was an inconsiderable increase.

OLD ALE and STOUT, in half-pint doses, always caused a sustained increase of about ¾gr. per minute for about two hours, and although the general effect was less than that of rum and milk, it was (in the small quantities just mentioned) greater than that of alcohol or wine.

We investigated the action of the aromas of fine wines and spirits, by inhaling them, and in every instance found that they lessened the respiratory changes, but how far this might be due to a local action on the lungs, by their direct application to the surface, we cannot tell.

From these experiments it is clear that alcohols have an influence over the respiration—that this is diversified with the substances employed and the persons experimented upon, and that the effect of alcohol does not measure the effect of all alcohols. Hence we have proof that there must be other active agents in them than alcohol, and must call in the aid of the chemist to investigate more closely their composition. The uniform and conservative influence of the aromas of wines illustrates well the value which is attached to age in wines—a condition under which alcohol is lost and aroma gained. It also attaches an importance to the evil of manufacturing wines much higher than that of a mercantile fraud, for such composition cannot have this truly essential quality of wine when acting upon the system—an action, it will be observed, the reverse of that of the alcohol. I need not remind you that although we do not know the chemical composition of the aromas of flowers, we know that they are powerful agents. To many the scent of the rose, and the jasmine, and the wall-flower is very exhilarating, but to others it causes faintness; and in all persons the continuance of the influence is very apt to produce headache; whilst various chemical preparations emit odours of even a fatal tendency; and hence we need have no *primâ facie* difficulty in believing that the choice, full-bodied aromas of wines exert considerable influence on the human system.

Beers contain two substances, in larger quantity than is found in wine, which we have shewn to have the effect of increasing the respiratory changes, viz., sugar and gluten. The diagrams show that sugar has an influence which is great and rapid, both in its rise and fall, while gluten acts moderately and with great uniformity. The degree of action of the former is greater than that of beer, whilst that of the latter is very similar to it. I have elsewhere endeavoured to show that this action upon the respiration is not direct, but it is clear that the gluten, at least, causing the loss of more carbon than it supplies, must have the power of promoting the digestion or ultimate transformation of other food. Hence it will appear that the difference in the actions of beers from spirits, and of wines from alcohol, may be in part explained; and that instead of one, we have at our command a number of powerful agents, however imperfect our knowledge of them may at present be.

2. I now proceed to consider the second statement, viz., that alcohol is transformed in the system, and produces heat. The importance of this statement is that it is equivalent to affirming that alcohol is a true food, and with it is

associated nearly all that physiology can say for or against its general use.

We may, in a few words, describe the grounds for the chemical view thus expressed.

There are two principal excretions from the body, one composed chiefly of nitrogen, and the other of carbon. There are likewise two great divisions of food taken into the body, one containing carbon principally and the other nitrogen, with a small amount of carbon. The body itself is composed of structures which contain nitrogen, as the muscles, and of fat which does not contain nitrogen but is rich in carbon; and lastly there are two prime processes in the system, by one of which, or the combustion of carbon and hydrogen, the body is warmed, and by the other, viz., the transformation of nitrogenous materials, it is nourished and repaired. Hence, then, it seems that the nitrogen taken in food is to be associated with the nitrogenous tissues of the body, and both are to pass out in the excretion of nitrogen, whilst the carbon and hydrogen in food are associated with the fat of the body, and both being burnt, pass out by the lungs as carbonic acid and water. The former class of foods, viz., the nitrogenous, have hence been called "flesh-formers," and the latter "heat-formers." Such is a bird's-eye view of the general question.

Now alcohol consists of carbon and hydrogen with oxygen, and hence has all the elements of the one class of foods. Moreover it has a special attraction for oxygen, and when its elements unite with oxygen, whether in or out of the body, evolution of heat occurs; and as in respiration oxygen is introduced into the system, there is a presumption that it does unite with the carbon and hydrogen thus offered to its action. Then if to this we add the fact that starch, the basis of our farinaceous food, also composed of carbon and hydrogen with oxygen, is certainly united with oxygen in the system; and finally, that although alcohol is taken into the body, it has not been proved to pass out of it, we seem to have a demonstration that it is consumed in the system, and does cause the evolution of heat.

I do not stay to say that these theoretical views of nutrition are now undergoing a change, so that whilst the outlines may remain, it is probable that it will be shown that the distinction of heat-forming and flesh-forming matters is not so cleanly marked as the theory assumes, but that the two kinds are mutually dependent upon each other. Neither need I advert to the fact that, as heat is produced from every chemical change, it will follow the conversion of nitrogenous as well as of carbonaceous compounds; but I will state the circumstances which militate against the view of the conversion of alcohols within the system:—

1. After alcohol has been taken, it may be obtained from some parts of the body, as the brain, in the state of alcohol unchanged for thirty-six hours afterwards.

2. MM. Lallemand, Perrin, and Duroy have, within a few months, shown that alcohol may be detected in the breath, the perspiration, and other excretions for at least eight hours after a moderate dose has been taken. This is almost the "missing link" which all have sought for who have disbelieved the chemical theory, but it is not quite perfect. You will perceive, from the experiment now before you, that my friend, who took 1½ ounce of alcohol half an hour ago, by breathing through this solution of the bichromate of potass, in strong sulphuric acid, causes the colour to change from red to green. This is the ground for the statement just made. These French gentlemen have not procured the alcohol as such from any of the excretions, but they prove its presence by this reaction; neither have they been able as yet to show that the quantity of alcohol which thus leaves the body is proportionate to that which entered it. The value of the test rests upon the fact that no element in the respiration, when alcohol has not been taken, will produce this change; and that no transformation of alcohol—as, for example, into the allied substance, aldehyde—will cause it; and as these facts are said to be true, it is affirmed that the change must indicate the presence of alcohol in its own form and properties. This is a new and most interesting discovery; and, although its results are not complete, and require confirmation, I ask you to bear it in your memories. The above authors proved the transpiration of alcohol from the skin of a dog, but I am happy to have the opportunity of showing you an experiment, which has never before been performed, namely, the enclosing in an air-tight bag the arm of a gentleman who had previously taken 1½ oz. of alcohol, and passing a current of air through the bag into the above-named test liquid.

Hence we seem at once to have cut the ground from under the feet of the chemical theory which previously appeared to be so conclusively established, and have proved that alcohol is not transformed, does not produce heat, and therefore is not a food. But long before this demonstration appeared, my experiments fully convinced those of us who were experimented upon that alcohol is not a food. The volatile elements or aromas with which it is associated in wines and spirits could be perceived in the excretions, and an alcoholic smell is well-known to exist in the breath of those who have drunk alcohols. Its mode of action upon the general system was not in the least like that of a food. The diagrams before you, although showing the general results upon the respiration which I have described, show, at the same time, how much difference in the degree of effect was found in each experiment of the same series, instead of the uniform and steady increase and decrease which mark the action of true foods. It did not in any degree satisfy the appetite, or give that sensation which marks the supply of nutriment. It is true that heat was felt after taking alcohols, but after a short time the sensation of cold was even greater—a sensation often sudden and distressing, and both were quite apart from the temperature of the external air. During its action, there was at first excitement of the spirits, but from the first there was relaxation and want of tone, and indisposition to use the muscles. After the action upon the consciousness had subsided, there was none of the vigour and healthful warmth which are found at the same period after a meal, but languor, lassitude, *malaise*, and misery. I will transcribe the notes of the effects in one or two experiments, with the period at which they occurred after the introduction of the spirit, again reminding you that all the experiments were made upon an empty stomach in the morning.

After taking 1½ ounce of alcohol in May, it is recorded as follows:—In 6 minutes, giddiness: in 10 minutes, violent inspiratory efforts and greater giddiness; in 13 minutes, more blood sent to the skin, as shown by heat, fullness, and swelling of the hands and face; in 15 minutes, very great giddiness; in 25 minutes, oppressiveness, heat and fullness of the head, whilst at the same time general chilliness, relaxation of the muscles, heaviness of the hands, indisposition to move a finger, and lessened power of controlling the muscles; in 23 to 28 minutes, there was the full effect; in 30 minutes we felt relieved, and there was a semi-cataleptic state, or one in which it was pleasant to leave the finger or any part of the body just where it might happen to be; stiffness of the forehead. In 43 minutes, consciousness quite regained, expiration still constricted; in 44 minutes, there was a sense of fullness at the top of the head; in 54 minutes, there was a sinking, unpleasant sensation at the stomach, and oppressed expiration, but muscular control was regained; in 58 minutes, the inspiration was much less violent; and in 71 minutes, all that remained was an unusual sensation at the stomach, and tingling at the top of the head.

A friend, who was also experimented upon, recorded that the skin was dry, as if exposed to an east wind.

In another experiment with fine old rum, taken in April, the effect was noted as follows:—

In 4 minutes, slight giddiness; in 8 to 13 minutes, dryness, and soreness on the tip of the tongue, lessened muscular power, stiffness of the face and hot hands; in 15 minutes, talkativeness and merriness; in 20 minutes, dreaminess; in 25 to 30 minutes, a purring or continuous buzzing sensation through the whole body, and a pumping sensation in inspiration, as if the quantity of air in-

spired was really greater than it proved to be. About this time was the greatest effect; the expiratory power was enfeebled, and the skin was hot, harsh, and dry. My friend was happy and hilarious, with his good-natured face glowing like a fire, beaming with happiness, and tears trickling down his cheeks; in 42 to 47 minutes, the influence was a little lessened, the inspiration perhaps a little shorter, and the influence upon expiration was increased; in 50 minutes we became, first, more taciturn, and then miserable; in 56 minutes, the influence was greatly lessened; in 61 minutes, a general sensation of cold; in 85 minutes, the consciousness was clear, but in two hours the effect had not passed away.

Now, apart from all other questions, may we not remark how different are these results from those following a meal of ordinary food; and were we wrong, think you, in stating that alcohol is the great, not alimenter, but disturber of the system?

We certainly arrived at the conclusion that it does not in any way act as a true food, that it does not produce heat by its transformation, and that it passes out of the body as alcohol or some very analogous compound.

But the fact remains that during a period in the action of alcohols there is increased sensation of heat. This may arise from either of three causes, viz., 1st, Increased production of heat whilst the rate of dispersion is constant; 2nd, Diminished rate of dispersion whilst the rate of production is constant; and 3rd, Simply increase in the amount of blood sent to the skin—the only organ by which in health we are cognizant of temperature.

In reference to the 1st, we remark that no thermometric proof has been given that during the action of alcohols the temperature of the blood in the central parts of the body is increased. As to the 2nd, it has not been proved that the dispersion of heat is increased, as might be shown in the effect of the radiated heat upon surrounding substances as ice; but on the contrary, it is highly probable that the dispersion is diminished. The dispersion of heat takes place both by radiation and evaporation; by radiation as if it were merely inanimate matter, but by evaporation as a living organism; and it cools by the absorption of heat as the fluid becomes converted into vapour. The freer the perspiration or the evaporation the cooler the body becomes because vapour absorbs and renders latent 1,000 times more heat than was held by the volume of fluid from which it was derived. We have just shown that the skin is commonly dry and harsh during the action of alcohols, and as that is a state the opposite of that in which free evaporation or perspiration occurs, it follows that it is one in which there is lessened transpiration and consequently lessened removal of heat.

The third condition is one mainly dependent upon the force of the heart's action, by which the current of blood is driven to the surface; and there can be no doubt that in the hot stage of the action of alcohol, the heart's action is increased. This will give increased sensation of heat, by bringing more warm blood to the skin, and, at the same time, will increase the dispersion of heat in any climate in which the temperature of the surrounding air is less than that of the body.

Hence we conclude that, whilst there is a temporary increase in the sensation of heat during the early action of alcohol, there is no proof that there is an increased production of heat; but it is more than probable that there is diminished dispersion of heat and the result is therefore temporarily the same. Alcohol does not produce, but it saves heat. It is not transformed, and it is not a true food.

In this action all alcohols act alike, for it is due to the alcohol alone.

3. We have now to consider the third statement, viz., That alcohols lessen the waste of the system.

Now, assuming this to be so, do we well understand what it means? It is assumed, on the face of it, that by lessening the waste the system gains, and that the gain is an advantage. But health means a due balance between want and supply, and if you lessen the waste you should at the same time lessen the supply, or you will have the evils of excess; and if you lessen both the waste and the supply, it follows that you have lowered the vital actions below that amount which constitutes health. There must be a certain fixed amount of vital action to maintain life, and there is always a further variable quantity to enable us to fulfil the active duties of life. To save waste, therefore, in health and with due supply, is to induce disease. Now, as to the fact of there being diminished waste during the action of alcohols.

It has been affirmed, on the testimony of many observers, that alcohols lessen the amount of carbonic acid evolved; but if, as the same authorities state, the alcohol is consumed and converted into carbonic acid and water, why have we not an increased instead of a lessened evolution of carbonic acid? The two statements nullify each other. I have elsewhere pointed out the sources of error in these statements, and shown that they are due to inferring total amounts from mere percentages, as in Prout's experiments; from mixing up other influences with those of alcohols; from inferring large quantities, as those of a day, from observations occupying a minute; from the natural variations of vital action during the day not having been then known; and from believing that one kind of alcohol represents the whole series. To-night I have stated to you that some alcohols do lessen the amount of carbon expired whilst others increase it; but it will be observed that the effect, in either direction, is but small, and that alcohol, by its action upon the heart, apart from its own transformation, may in a small degree excite the vital actions and thereby slightly increase the excretions.

It is also affirmed that, under the action of alcohol, there is less nitrogen, or urea, evolved, and this seems to have been established by many experimentalists, among whom I would mention Hammond, and thence it is asserted that the muscular tissue of the body is saved. Now, I beg of you to understand that the connection of urea with muscular tissue is far less established now than it was years ago, and I have shown, by recent experiments at Coldbath-fields prison, that, in the absence of food, the labour of the tread-wheel (which is surely muscular action enough) does not increase the evolution of nitrogen, or urea. But however this may be, there is a connection between urea and food, and we cannot read Hammond's experiments without seeing the fallacy upon the face of them. He was living at a border fort of the United States Government, with a medium temperature of 73° in the shade, and ate from 16 to 22 ounces of flesh, 18 oz. of bread, 6 oz. of soup, 4 oz. of beets, 1 oz. of butter, &c., per day, and he records the following statement:—

"Whilst the experiments were progressing, the healthy action of my system was much disordered. Headache was constant; sleep was disturbed; the skin was hot; pulse full and bounding, averaging 98 per minute; and there was on two occasions, after eating, a slight palpitation of the heart. My appetite was capricious. Sometimes disgust was created by the mere sight of food; at other times I ate with a good deal of relish. I think I should have been seriously ill if I had continued the investigation longer."

Surely, here we have an abundant explanation of the diminished urea or nitrogen, which he discovered, not in that the alcohol lessened the waste of his tissues, but that it made him ill. The food which he took was not digested and transformed into tissue, but accumulated, and at length, after each experiment, induced a violent, but, as he says, salutary diarrhœa. In fact, whilst eating excess of food, and perhaps gaining weight, he was starving his system, and there would necessarily be a less amount of the products of transformation.

This, I have no doubt, is the explanation of all such experiments, but it will vary as the system is able to rid itself of its dangerous disturber. In our prison experiments we found that alcohol lowered the excretion of the nitrogen

at first, but on the third day the quantity regained its former level.

Hence, I consider it to be proved that if alcohols do lessen the waste of the system in health, they do it actual injury.

We have now cursorily considered the three statements proposed for discussion, and have shown :—

That the class of alcohols is a heterogenous one, both in its composition and action.

That alcohol is only one important element of the class.

That the aromas of wines and spirits have a decided action, and constitute an essential part of the value of those substances.

That the gluten and sugar of beers are valuable agents in promoting the assimilation of food ; and in proportion as wines contain the same elements they have a similar action.

Hence, there are three actions due to alcohols (apart from any questions of their use as foods) viz., the general stimulating and disturbing one of alcohol, the conservative one of the aromas, and the digestive one of gluten and sugar.

Alcohol is not a true food, and it neither warms nor sustains the body by the elements of which it is composed.

It lessens the dispersion of heat by lessening the action of the skin, and it increases the action of the heart.

When it lessens the excretion of carbon or nitrogen, it does so by disturbing the assimilative process, and thus, instead of saving, it starves the system.

I will now bring this communication to a close, by categorically stating a few facts which arise out of the preceding discussion.

1. Alcohol, although it is not a food, is a medicine, since it varies the intensity of the processes of the system, without being itself transformed and converted to the purposes of the body.

This is a fundamental fact, and when it is well understood, it will not be found difficult to define the conditions in which alcohol is useful and not useful, and I will now name a few of them.

Thus, when the want and supply of the body are duly balanced, and in proper amount, as in the ordinary condition of health, it is not useful, but, by disturbing the balance of the vital actions, may be injurious.

When the vital wants are greater than the supply, or than the due transformation of the supply of food, the volatile aromas are useful.

When the whole vital processes are low, as in fatigue and debility, it is probable that alcohol may be useful.

When the powers of digestion and assimilation are deficient, it is probable that beer may be useful.

When, by exertion or cold, there is an ususual but temporary call upon the system, which cannot be responded to by suitable food, alcohol may be useful.

In hot climates, as India, when the system is enfeebled, when the skin is perspiring too profusely, and the powers of digestion and assimilation are deficient, it is probable that alcohols may be useful.

When, under the same conditions of temperature, there is not too profuse a perspiration, and the temperature of the external air is equal to, or higher than, that of the body, alcohols must be most dangerous.

Of two men living under the same external conditions, the one with a perspiring skin may take alcohols largely without danger, so long as the skin perspires, but the man who has habitually a dry skin must avoid them.

In cold climates, where the powers of transformation of food and the supply of food should be very great, the free or continued use of alcohol must be dangerous. This has been affirmed to be true by Dr. Rae, and is the experience of many northern navigators.

Lastly, In young persons, in whom the supply of food should be excessive, in order to maintain growth, the constant use of alcohol may be very dangerous, and prevent growth.

Such are a few of the medical requirements of alcohols, apart from actual disease.

2. Although alcohols are not foods, and cannot supply the place of foods, they cannot be dispensed with, but should be prescribed medicinally and as carefully as any other poisonous agent.

3. The English are so notorious for their love of medicine as to be designated a nation of quacks, but yet it is not sufficiently appreciated that, whilst they pay only some five or six millions a year to the whole medical profession, they spend sixty millions yearly in the purchase of this one drug.

4. The habit of wine drinking is in part due to the evil of late dining. In other experiments, I have shown that all the vital actions of the body decline in the evening, and hence, at that period, the appetite needs the stimulus of artificial food ; and alcohols are then more requisite and exert less influence. If, as a nation, we would avoid the use of alcohols, we must distribute the food more largely in the early, and less plentifully in the later, parts of the day ; for, at the former period, the system has greater necessity for it, can more quickly digest it, and has then a more simple taste for it. In doing this, we need not revert to the old-fashioned suppers, but with plenty of food taken early, tea and coffee will suffice for the later meals.

Alcohol drinking is one of a connected series of evil habits. To remove one, we should lessen all.

5. The manufacture of beers and their use in India, are national questions.

If the action of ales be as above given, of what value, we may ask, are the bitter beers of the day ? It is true, that they have done well in supplanting the alcohol of the strong, old-fashioned ales, but they have not done well in having given strychnine or quassia water, for sugar and gluten. They are grateful, but they are comparatively useless, except as bitters, and induce a vast waste of money.

If ales be taken, not as alcoholic compounds, but as digestives, then the good, full-bodied malt and hop ales, now gone out of fashion, are required ; and these would be more useful when drunk in quantities of wine or ale-glasses full, than in large volumes from our pewter pots and glass tumblers. Let those who would drink ales rationally, select the best quality, and drink them as they would drink rich and full-bodied wine, and such a course, if generally adopted, would be an effectual temperance movement.

The introduction of strong ales into an Indian climate, is opposed to all that nature teaches us, and whilst medicinally, (and therefore in numerous selected cases) they may be useful, as ordinary dietetics, or for any large body of men indiscriminately exposed to great heat, they must be most injurious. The only valid excuse for our conduct is that drinking ale is a less evil than drinking arrack.

In this matter we are in truth pandering to one of the failings of an Englishman—that of taking England with him into every climate ; and I cannot but fear that this act of our government is as dangerous as it is scientifically indefensible.

Lastly, there is a wide-spread conviction, still existing amongst our working classes, that they cannot do without their beer, and so far as it is based upon truth it implies that this is necessary to the digestion of the starchy food with which so many are obliged to be content; but it is chiefly based upon the fallacy that the comfortable sensation which they experience after drinking is indicative that beers nourish them. In a large hospital experience, I am unable to convince the poor washerwoman, and even the man who has no resources, that 2d. spent in milk will do far greater service than when spent in ale or gin. No doubt it is easier to do without these stimulants when there is abundance and variety of food, warmth and pure air, all of which are still lacked by a very large proportion of our community, but when the working classes shall truly understand the exact value of alcohols, we need not doubt

that we shall soon find even the sober man better fed and housed. But habits of temperance and economy are high up in the social scale of duties, and the temperance movement amongst the poor and ill-fed will be successful in proportion as it is associated with all other efforts tending to the religious and social elevation of our race.

DISCUSSION.

The CHAIRMAN said, in calling upon the meeting to discuss this paper, he would recapitulate a few of the points which he thought it most important for them to bear in mind, as it would be impossible, in the limited time at their disposal, to enter into all the social and moral questions involved in the subject. It seemed to him that Dr. Smith's researches had been most valuable. He had in the first place shown them that, even from the time of the Flood, the instinctive observation of man had come very near to the truth, and that in the pre-scientific periods it was considered that there was a difference between one fermented liquor and another, between one stimulating drink and another. They would, doubtless, recollect how this idea was remarkably exemplified in the two inimitable pictures of Hogarth, "Beer-lane" and "Gin-alley;" the different effects of those two beverages upon the human frame being strikingly and truthfully pourtrayed. But when science took up the question it (unfortunately in his opinion) invented the plural word "alcohols." It would, perhaps, have been better to have adhered to the old terms of fermented liquors or spirituous drinks, as these were less likely to lead to confusion. Attention had been drawn to the remarkable difference between the effects of various wines, which was probably owing to the presence of different ethers, which no doubt varied much in their action on the human system. He thought Dr. Smith had made a slight error, when speaking of the experiments of M. Lallemand and his colleagues, in stating that aldehyde did not give the characteristic reaction with the test liquid, for their investigations had shown that aldehyde did not pass off during the experiment. The second point which Dr. Smith made was that alcohol was not a food, by which term he meant that which conduced to the actual growth of the body. He was probably right in stating that alcohol did not actually supply matter to the body, but at the same time it was a fair subject for discussion, whether it did not contribute to the growth of the body in another way, by enabling more food to be taken and the food itself to be better assimilated by the system. The anæsthetic action of alcohol was probably valuable; and its stimulating effect on the nerves of the stomach might enable it more easily to take up food which otherwise could not be received into the system. Sometimes a person went home tired with the daily worry of life; he could not at the time sit down to his dinner with an appetite, because his nervous system was prostrated by exertion; if he rested for four or five hours, no doubt his appetite would return, but in the meantime his body would have been wasting through abstinence from food. If, however, he took a glass of wine, he would probably then be able to take food with a good appetite, and to digest it, and by that means he would contribute to the growth of his body. With regard to the term "waste," he agreed with the author of the paper, that it was an improper one to be applied in the present case. That which was called waste might be more properly termed metamorphosis, by which the vital functions of life were carried on. Dr. Smith had spoken at some length of the researches of Dr. Hammond upon this subject, and he had recorded that in instances where an excess of food was taken, or even where a sufficient quantity of food was taken to keep up the weight of the body, alcohol was deleterious. But no mention was made of the further series of experiments by Dr. Hammond, in which he took a diminished quantity of food, and in those experiments not only was there no loss of health from the use of alcohol, but the weight of the body was maintained; whereas it was proved that when he took a diminished quantity of food without alcohol, the body lost weight, and he also lost health. He thus showed that one of the great uses of alcohol was the enabling a person who either did not take sufficient food, or had imperfect powers of digestion, to avoid waste of the system. Alcohol then came in beneficially, and he believed that was the case in the majority of instances with those who could only take small quantities of food. These he believed to be the medicinal uses of alcohol to temperate persons, and that was a subject which he thought would be amply sufficient to fill up the time of the meeting.

Dr. LANKESTER thought they were greatly indebted to Dr. Smith, for the persevering manner in which he had followed this question up; and whatever differences of opinion there might be, they could not but give him the highest credit for the manner in which he had carried out these experiments, for they were no light matter, involving, as they did, getting up early in the morning, and voluntarily resigning one's self to intoxication before breakfast; and he imagined it required some considerable powers of persuasion to induce one's friends to do the same thing for the sake of science. At the same time, he thought Dr. Smith must feel that his experiments had been directed almost exclusively to one particular effect of alcohol upon the system; and if he found any fault at all, it would be that perhaps Dr. Smith had been a little too hasty in the deductions he had made from the special effects of alcohol which he had studied. The respiratory function was only one amongst a number of others which must be more or less affected by the action of alcohol, but it would appear that the experiments of Dr. Smith had been entirely confined to this. They must remember that the action of alcohol was very considerable upon the skin, upon the secretions of the kidneys, and upon the mucus membrane of the stomach and intestines, and all these must be studied before they could fully arrive at correct conclusions with regard to the general action of alcohol upon the system. Having stated these facts very generally (and the chairman, as a physiologist, would feel them to be of some importance) he would draw attention to the fact that Dr. Smith had not gone into detail as to the number of experiments upon which these results had followed. It seemed to him important to know the number of experiments made. Then, again, it appeared that some of the experiments were repeated upon the same individual with different results. It seemed to him that the experiments were not sufficiently numerous and varied to admit of any conclusion being drawn with regard to the influence of alcohol on the respiratory functions, much less on the whole system. We might, therefore, be inclined to ask whether these results might not, in some measure, be due to individual peculiarities, and whether it was correct to regard them as the constant effects of alcohol upon the human system. He gathered that Dr. Smith's conclusion was that alcohol in some manner acted upon the blood so as to produce the varied effects that were observed upon taking rum, ale, or stout, as well as other forms of alcohol, which modified the quantity of carbonic gas expired. It did not appear to him that that was clearly made out, and before arriving at any definite conclusion as to the results of taking alcohol, in order to judge of its effect on the system, we must investigate the action of alcohol before it gets into the blood, and ask whether there were not other effects of alcohol which produced these variable results in the condition of the respiratory system. He would point to the fact that alcohol, taken into the mouth, acted differently upon the mucus membrane from beer and wine; and these, if carried from the mouth to the stomach, would produce different results. There would be a difference according to whether the alcohol was taken in the form of pure spirits upon an empty stomach, or with food, or in the form of wine or beer; in each case, the action upon the mucus membrane would be different, and in all these cases might eventually act differently upon the respiratory functions. Then, after the alcohol had been primarily

taken up from the mucus membrane, and carried into the blood, there seemed to him to be different effects produced by alcohol upon the nervous system independent of its effects upon the respiratory functions. Thus they found that alcohol in a pure condition acted differently upon the nervous system to what it did in the form of wine or beer, and produced a different series of effects; and they must remember that, as to the general result of habitually taking spirit or beer, in the first case the digestive functions were interfered with, whereas beer alone would produce an entirely different effect, and yet, according to Dr. Smith, the effect was the same on the respiratory functions. In this way the action of alcohol might be compared to that of salt. Thus it was found that a man might take small quantities of salt from day to day with his food with benefit, but he might take enough to act upon the nervous sytem and produce vomiting, or upon the mucus membrane, to produce diarrhœa. The effects of alcohol, therefore, must be estimated individually in order to judge of its general results upon the system. He thought they could not come to general conclusions from those limited experiments. Dr. Smith had dwelt very properly upon the theory introduced more particularly by Dr. Liebig and the school of physiological chemists which arose after his writings upon agriculture and organic chemistry. All who had read the works of Liebig and his successors of the same school, must feel that many hasty conclusions were arrived at. Liebig himself was an admirable chemist, and came to admirable conclusions as far as his facts went, but there was an absence of that deeper study of the influence of agents upon the human body which could alone command the assent of physiologists. An instance of this was furnished in the fact that Liebig hastily regarded alcohol as a heat-giving food, and Dr. Smith had done good service in not only showing that those who were opposed to Liebig in this theory were right, but also in demonstrating that the action of alcohol was not that of a food, in the sense of contributing materials to form the tissues of the body, or absolute fuel for supplying animal heat. But, at the same time, as the chairman had well observed, this word "food" was used popularly in so wide a sense as not to be suitable for scientific purposes. People could hardly be brought to regard bread and cheese as food, and ale or porter as medicine, and, therefore, the chairman had properly designated the latter as auxiliary food,—at the same time, they must allow to the public the use of this word "food." An interesting point then arose as to what was the influence of alcohol on the two great functions of food, that of flesh-forming and heat giving. At first sight it would appear from these experiments as though alcohol diminished the heat of the body, because in certain cases the quantity of carbonic acid gas expired was taken as the measure of heat produced, and there seemed to be such a discrepancy between the action of rum and other descriptions of alcohol, that he was inclined to doubt whether the free carbonic acid gas thrown out in these cases could be taken as the measure of heat produced in the body. At any rate, even in the case of rum, they must not suppose that alcohol acted in itself as a fuel to the body, but rather as a poker acted upon a fire—stirring it up, and producing by that means an increased quantity of carbonic acid gas. Dr. Smith had, however, suggested that the alcohol of rum was not an agent of that character, but he had placed it within the class of those aromatic substances in wine which decreased the respiratory action. This was a discrepancy in his theory. Supposing they found that the carbonic acid gas manufactured in the system combined with some other constituent of the body and passed off in some other form, then he did not think the conclusion of Dr. Smith was right—that alcohol could not be regarded as an increaser of heat. Then there remained the other important question, viz., the influence of alcohol upon the muscle or flesh-forming portion of the body. How did it increase this? and did it, when the substance was deposited in the body, prevent its passing to decay too rapidly? It appeared to him that under certain circumstances, according to the results of Dr. Hammond's experiments, and those of Becker, Houghton, and others, it did act in some such way, either by direct action upon the primary process of digestion, or in the secondary process of assimilation, both of which had to do with the muscle-forming functions of the body, and that it did increase that power in certain cases. This was seen in the case of old people, in whose systems the tendency to waste was greater than that to form tissue; alcohol in such cases acted either in producing more tissues, or arresting the waste of such as were deposited in the system, and such persons, though not in a state of disease, were thus enabled to pursue the duties of life with more comfort by the use of alcohol. There could be no question as to the effects of some forms of alcohol in the production of adipose matter in the body, and they found that where large quantities of alcohol were habitually taken that effect was produced, and that where there was a predisposition to form fat, alcohol was a means of facilitating its production. These were questions which could not be set aside, when they looked at alcohol from that one point of view. The effects of alcohol generally were such as to impair the natural processes going on in the human frame; and that it was destructive to health and life, to a considerable extent, must be generally admitted, but that it could be successfully abolished from European society he did not believe, and he should have to reflect much before he could consent to such a course. The races of mankind most distinguished in intelligence, morality, and religion, had been those who had habitually taken certain quantities of alcohol, and he should hesitate before he took a step which might hazard the retrograding of a nation in its physical and vital condition.

Mr. MORSON remarked that he should be sorry if this paper were the means of promulgating what he believed to be a popular error, in respect of strychnine being generally employed to impart the bitter taste to ale. He believed this was a perfect fallacy, and he would ask Dr. Smith on what authority, if upon any, he had made that statement. He would mention the fact, that on one occasion a French chemist applied to him to know how it was so much strychnine was consumed in England, as he entertained the popular notion that it was largely employed by our brewers in the place of hops. The fact was, that the large consumption of strychnine both in this country and in Australia, was attributable to its use for the destruction of vermin. He thought such a statement as had been made in the paper should not be allowed to go forth uncontradicted.

Dr. HERBERT DAVIES said there was one point in the remarks of Dr. Smith which was exceedingly important to those who were engaged in hospital practice. In such a practice the cases of *delirium tremens* were very numerous, and the habits of persons so affected had been to live for weeks and months taking scarcely any food, and following the practice of Sir John Falstaff—a half-pennyworth of bread and several shillings worth of sack. It was, however, remarkable that in many cases there was no emaciation of the frame, and the wonder was that with so little solid food they could perform so much manual labour. He thought the *rationale* of the matter was this, that alcohol in certain forms of spirituous liquors, prevented the waste of the tissues already formed in the body; but whether it acted by direct assimilation or in keeping up the tissues once formed, it was difficult to decide. His own belief was, that the effect was to keep up the elements of the tissues, and to prevent them being carried off by the excreta, as would be the case in a normal state of health.

Mr. P. L. SIMMONDS said that the opinions advanced by Dr. Smith, with respect to the uses of alcohol in warm and cold climates were certainly opposed to the generally received opinions, for Dr. Smith appeared to consider that alcohols might be useful in certain conditions in warm climates, and injurious in other conditions in cold climates. It depended on the form in which they were administered.

In the arctic regions spirits were generally taken raw, while in the tropics, as far as his own experience went, when taken at all, they were usually taken in a very diluted form; indeed, the preference was given to light wines. The scientific experiments made with certain of the best known alcohols were highly interesting, and it would be more so if this investigation could be carried out as to the influence and effects of many others less generally known, although in extensive use. The fact was patent that almost every nation, savage or civilised, used some special fermented, vinous, or distilled beverage, indigenous or exotic; and the inference, then, would seem to be, that reason or instinct proved that they were, to a great extent, stimulating and invigorating. Taken in moderation, they would seem not only to promote digestion, but to supply carbon to the system, give energy to all the vital functions, relieve the lassitude of the nervous system, and call into action the intellectual powers. The sources of many of the native drinks were curious. The Japanese had their sácie; the Chinese their sam-shoo, from rice; the Pacific Islands their kava, from the root of the Macropiper (*Methisticum*); the Indians and Malays their palm toddy and arrack, from rice; the Tartars their koumis, from mare's milk; the Mexicans and Spanish Americans their pulque, from the agave, and their aguardiente; the South Americans their chica, from maize; the North Americans their Indian corn whiskey, peach brandy, and lager beer; the West Indians their rum; the Abyssinians their tallah or millet beer; the nations of Southern Europe their wines; the Russians and Poles their rika and wodka or potato whiskey; the Germans their beer; while beer, alcohol, and potato brandy, impregnated with a large amount of fusil oil, were now in very great use in several of the states of Europe. In the United Kingdom our liquors were more varied, embracing gin and whisky of home manufacture, to the extent of 24¼ million gallons, and about five million gallons of foreign spirits, exclusive of the imported wines and 477,000,000 gallons of beer drunk. Although in this, as in everything else, there were excesses and abuses, among certain classes, of a wholesome stimulant or medicine, to adopt Dr. Smith's phraseology, yet it was certainly not indicative of growing intemperance in the nation to find that the present consumption of alcoholic drinks, British made and foreign, was, even with the increase of population, only about the same as it was ten years ago. Such calm and scientific investigation of the subject in its physiological and chemical aspects, was far more calculated to do good than prejudiced harangues, from well-meaning but intemperate partisans, and compulsory legislation.

The CHAIRMAN directed attention to the extremely deleterious nature of fusil oil, and inquired whether any one present could state in what description of liquors it was principally to be found. He had himself formerly attempted to use it in lieu of ether, as less expensive, but in every case its poisonous qualities rendered it inapplicable.

Dr. LANKESTER replied that he believed its effects were largely experienced by the drinkers of new Irish whiskey.

Mr. MORSON added his testimony to that of the Chairman, as to the deleterious nature of fusil-oil upon the human system.

Mr. MEREDITH expressed the gratification with which he had learned the fact that abstinence from spirituous liquors was gaining ground in all parts of the civilised world. It had been proved by experience, that in the coldest as well as in the hottest climates the hardest description of labour could be performed better without the use of alcoholic drinks than with them; and he was glad to find that abstinence was practised to a large extent by the working classes of this country. He was also gratified by the statement of Mr. Simmonds, that the consumption of spirituous liquors in this country had not shown any increase during the last few years. It proved that a great experiment was being made here, and he hoped the light of science would be applied, in order that the action of this substance on the system might be generally understood.

The CHAIRMAN then proposed a vote of thanks to Dr. Smith for a most valuable commencement of what he believed would be an invaluable series of researches, and for the interesting paper with which he had favoured them.

The vote of thanks having been passed,

Dr. SMITH, in reply, noticed that whilst much had been said of a general and indefinite character by some of the speakers, there had been but few facts stated, and but little information given to which he could reply. He reminded the meeting that his experiments, and the facts that he had adduced, had shown that alcohol has one action, aromas another, and the gluten and sugar of beers a third action, and each must be applied to the special requirements of each person; also that as alcohol was not transformed, it could not be a food, and could only aid in nutrition by its power to sustain the action of the heart and circulation, and to lessen the waste of heat by the skin —actions which were medicinal, and the essential ones of alcohol. This was the explanation of their beneficial effects under the influence of cold, and in many persons with defective appetite and powers of assimilation, as had been referred to by the Chairman. He had demonstrated that evening, on several gentlemen, that alcohol passed off by the breath for some hours, and for the first time had proved that it passed off from the human skin, as had been shewn for four hours by Mr. Critchett, who had enclosed his arm in an india-rubber bag, and carried the products of the perspiration over the proper test. In France it had been shown to pass off from the skin of the dog, but it had not been before shown to proceed from the skin of man, and from so small a part of the body as the arm. In reference to the action of aldehyde upon the test, he believed that M. Lallemand had stated that aldehyde had no influence upon it. As to the determination of the amount of waste proceeding when alcohol had been taken by Hammond with insufficient diet, he remarked that weight was no absolute test of waste of tissue, since alcohol had been shown to prevent the excretion of water and fæces, which would increase the weight for a time. Hammond still took ten ounces of meat daily, when he was said to be losing weight, but as the total loss in five days was only three-quarters of a pound, when the imperfection of scales was recollected, and the difficulty of weighing a man accurately, also the variation in the amount of excretion remaining within the body, it was absurd to attach importance to so small a change. Alcohol rendered the weight stationary, and since it decreased the amount of urine and fæces evacuated, it was only surprising that it did not do morethan this. With insufficient food the skin was very active and the heart was enfeebled, and therefore alcohol, by its essential actions, was likely to do temporary good. Hammond's experiments on carbonic acid were not valuable, since he inferred the total quantity of the day from three experiments of one minute's duration each, made observations after food had been taken, when the quantity was very variable, sought to inspire as in health, and, therefore, only to obtain per centage results, and used defective apparatus. He (Dr. Smith) believed that the results of these experiments were not satisfactory. He had shown in his paper the action of alcohols upon the respiration, the urea and the secretions, and did not know what more Dr. Lankester could desire. It was no evidence that his experiments on rum and other alcohols were not correct, because Dr. Lankester could not explain the results. The first step was to prove the action, and the second was to find the reasons for it. He had proved the first, and perhaps Dr. Lankester, instead of throwing doubts upon them in a general manner, would disprove them by experiment and satisfy himself as to the cause of the results. His (Dr. Smith's) results had been proved to accord with the observations of the Chairman in reference to Hogarth's delineations, and with universal practice. He did not know how to show such an action upon the nervous system as Dr. Lankester had referred to, since alcohol had been proved to enter the blood in less than

two minutes, and he had felt it in the brain in three minutes. The action upon the heart and brain was not through the general nervous system, but by direct contact. It had been found in the brain longer than in any other part of the body. His (Dr. Smith's) experiments had been made upon healthy persons, with moderate doses duly diluted, and under conditions the most favourable to truthful results, and although there would be differences in effect from differences of dose, they would be always in the same direction. The stronger the spirit the greater would be its local action. Alcohol certainly did not produce fat, but the other elements of beer did so. Fusil oil was found in all inferior spirits, and in the later hours of the distillation of alcohol. It was believed to affect the head, but he had been informed by an eminent man, that he had seen a person drink a glass of bad spirit with a relish, which he knew contained half the quantity of fusil oil. Strychnine was a powerful bitter, so that a drop of a solution of strychnine added to one pint of water made it very bitter, but not in the least poisonous. It had been erroneously supposed that, because strychnine was a poison, the use of it in manufacturing beers was injurious, but in the limited quantity in which it was used as a bitter, it was very useful medicinally, and was much used in homœopathy. He (Dr. Smith) had no new facts as to its employment, but he had referred to it, not as an injurious, but as a bitter agent, and it was clear that some bitter was used other than hops. Beers as mere bitters were totally different things from beers containing plenty of sugar and nitrogenous matter fitted to aid digestion. He was startled at the remark that Dr. Lankester associated the intelligence of nations with the habits of drinking alcohols. All nations, however degraded, had found out fermented drinks, and must therefore be distinguished for intelligence. In this country, those who drank alcohols freely, as the *habitués* of gin-palaces, were not remarkable for intelligence. He saw no such connection as that which had been asserted, and he would think that man the most intelligent, *cæteris paribus*, who abstained from the use of alcohols as a rule, if he were in good health, and took them as circumstances arose which called for their employment. Moreover, as the body had a marvellous power of self-correction and adaptation, we were all enabled to use many things within certain limits, which, although not necessary, did not become injurious. Alcohols might be taken as many persons took medicines, namely, as luxuries.

The paper was illustrated by a series of experiments, tending to show that alcohol passes off from the body unchanged, both by the breath and by the perspiration, for several hours after being taken into the system. Three gentlemen, the first having taken an ounce and a half of alcohol three hours, the second two hours, and the third half an hour previously, breathed for some minutes through the test liquid described in the paper, all producing the characteristic green colour, whilst others who had taken no alcohol for twenty-four hours, on breathing through the liquid, caused no change whatever. Another gentleman, who had taken a similar quantity of alcohol, had his arm enveloped in an air-tight bag, through which a current of air was passed into the test liquid; and this experiment being repeated several times during the evening, on separate portions of liquid, the characteristic reaction was shown at the expiration of the first, second, third, and fourth hours after the alcohol had been administered. This was the first occasion on which the last-mentioned experiments were performed.

The Secretary announced that on Wednesday evening next, the 23rd inst., a paper, by Mr. Leonard Wray, "On Tea and its Production in Various Countries," would be read.

INTERNATIONAL EXHIBITION OF 1862.

The *Building News* says:—"We rejoice to hear that Mr. Bell is preparing for the Exhibition of 1862, a statue of Cromwell, 10 feet high. From the preliminary half-sized statue, this promises to be finer than any of this gentleman's works of this kind—better even than the justly-admired Falkland, in the Houses of Parliament. The attitude is strikingly original and characteristic, and fully embodies the vigorous ruler of the commonwealth, of whom Macaulay so justly says:—'Such was his genius and resolution that he was able to overpower and crush everything that crossed his path, and to make himself more absolute master of his country, more dreaded and respected, than she had been during many generations under the rule of her more legitimate kings.'"

POLYTECHNIC INSTITUTION.—EDUCATIONAL DEPARTMENT.

In this department, which is under the direction of the Rev. Charles Mackenzie, there are both morning and evening classes, the former being designed principally for ladies, and for these the subjects are Arithmetic, German, Lithography, French, Drawing, Bible History, Greek, Latin, Bookkeeping, English Grammar, Chess, Elocution, Botany, Literature. In the evening classes, in addition to the subjects just enumerated, the following are taught: Writing, Algebra, History, Common Things, Chemistry, Architecture, Practice of Commerce, Singing, Practical Geometry and Engineering, Physics, and the Principles of Engineering Construction.

Some of the classes are specially arranged for the University Middle Class Examinations, as well as for those of the Society of Arts.

With reference to instruction in Architecture and Building, the prospectus says:—

A growing desire for some opportunities of systematic instruction in Architecture and Building has latterly been evinced, and should architectural examinations, as now proposed, become established, such opportunities will become indispensable.

It is believed that short courses of instruction, bearing upon the practice and requirements of the present day, while they are not intended to take the place of an extended and comprehensive curriculum, will be found acceptable and useful to many young men engaged in pursuits connected with architecture, viz., the pupils or assistants of architects, engineers, and contractors, and those engaged in the superintendence of works, or the skilled departments of building, art-workmen, and art-students.

For this year (1861) three distinct but connected courses are proposed, each to extend through one quarter, concluding with an examination, and to be illustrated by diagrams.

The First Course, on the Essentials of Building;) or (1) Materials, and (2) Construction; the first to include stone, brick, timber, iron, glass, lead, zinc, cements, &c., with the ornamentation appropriate to each material; the second, foundations, masonry, brickwork, carpentry, joinery, &c.

The Second Course, on Architectural Character; or the history and practice of classic, mediæval, and modern styles of architecture, with notices of distinguished architects and their works.

The Third Course, on Modern Practice; or (1) Re-

quirements and (2) Methods of Working; the first to comprehend the special peculiarities of dwelling-houses, cottages, mansions, churches, schools, hospitals, theatres, &c., construction of buildings as to sound, heat, ventilation, and sanitary matters. The second referring to the duties devolving upon the architect, surveyor, &c.; also designs, competitions, plans, details, specifications, tenders, contracts, carrying out works, surveys, and the Building Act.

EXTRACTS FROM THE REPORTS OF H.B.M. CONSULS.

(*Continued from page* 112.)

BEET-ROOT SUGAR.—The cultivation of the beet-root for the manufacture of sugar has of late years received an immense development in the kingdom of Poland and in the adjoining provinces of Russia. The first factory was established in 1831, and the first refiners in 1839. The manufacture had increased to such an extent that in 1856 there were 52 factories in the kingdom; thirty-five were to be found in the government of Warsaw alone. The conversion of beet-root into sugar is entirely performed between the end of September and the commencement of April in each year, beyond which time the beet-root if kept becomes deteriorated. The total quantity of loaf sugar and sugar of a coarser character made in the season 1856-7 amounted to 29,013,000 lbs.

AT RIGA coined money cannot legally be exported from Russia, and the paper-money of the State cannot be brought in. It is taken away if discovered, and forfeited to the Crown when proved to be genuine.

VERMICELLI.—The manufacture of "paste" (or vermicelli, as it is called in England) continues to be one of the most flourishing trades in Genoa. There are about 100 manufacturers in Genoa itself, 20 in Sampierdarena and Nervi, and 14 in Savona. The export of paste in boxes in 1856 amounted to 11,238 quintals.

LEATHER.—At Leipzig leather becomes every year a more important branch of German industry. Above a million of hides are annually prepared for sole-leather alone within the Customs' Union, and the whole quantity of leather produced is estimated at 140,000,000 lbs. annually, of which tanned leather forms 80 per cent.

BARRELS made of Bosnian oak are said to discolour light wines, probably from the superabundance of gallic acid.

SALTED OLIVES are exported in large quantities from Brussa, in Turkey, chiefly to the Danube and Russian ports in the Black Sea. In 1858 considerable contracts were made for the delivery of the article on the coast at 12s. per cwt., and the produce of fresh olives for the same year was calculated at from 34,000,000 to 40,000,000 lbs., along the shore from Ghio and its adjacencies to near the Rhyndacus.

SILK is the richest production of the Austrian Empire, in which the total mean annual quantity of silk cocoons produced reaches 27½ millions of kilogrammes, about 60,630,000 lbs. avoirdupois, which, at Austrian livres, 430 give a value of 124 millions of Austrian livres, equal to about £4,230,000.

This production is divided as follows:—

	KILOGRAMS.	LBS.
Lombardy	15,000,000	33,075,000
Venice	10,200,000	22,491,000
Tyrol	1,568,000	3,457,440
Other Provinces	672,000	1,481,760
TOTAL	27,440,000	60,505,200

This statement is based on the reports of the several Chambers of Commerce, on the statistical annals of Milan, and on the observations of Giacini and Angelo Mazzold respecting the results of the year 1852, which is selected as a fair average; 1853 having been, generally, an abundant year, and 1854 and 1855, on the contrary, very scanty.

In the official reports of the year 1847, the production of cocoons in Lombardy was estimated at 19,624,500 lbs., and in the Veneto at 12,899,250 lbs. Assuming this to be a fair approximation, it results that, in five years, the production of cocoons throughout the Lombardo-Venetian Kingdom has increased 86 per cent.

The cocoons are converted into raw silk at the spinneries. The number of spinneries in Lombardy, in 1840, was 3,068, with 34,627 caldrons, besides smaller establishments with not more than one or two caldrons each. The number of caldrons now reaches 42,000, giving occupation to 95,000 persons during 50 days of the year.

Each caldron is calculated to produce 79½ lbs. of raw silk, hence the production amounts to 3,307,500 lbs., and the total quantity of cocoons spun in the Lombard spinning-mills must be reckoned, one year with another, at 41,895,000 lbs.; to make up which between 7 and 9 millions lbs. are imported from the Venetian provinces.

The 3,307,500 lbs. of Lombard raw silk (including 551,250 lbs. waste) give, at 2,945 Austrian livres, equal to about £1 the lb., a value of £3,333,000 sterling. The value of the cocoons is, therefore, increased by spinning, £428,000, two-thirds of which are consumed by the expenses of labour and fuel; hence, the net profit of the spinneries is equal to between £102,600, and £140,000 sterling.

In the territory of Venice the spinneries are numerous, but on a small scale, with the exception of a few in the Friulano, which receive cocoons from Gorizia and the seacoast, and a certain number in the Veronese and Vicentino. These two last provinces contribute the larger portion of the cocoons sent to Lombardy and the Tyrol, owing to which exportation the number of their caldrons decreases annually.

The caldrons in the vicinity of Venice may be calculated at 20,000. They afford employment to 48,000 persons, and spin 16,537,500 lbs. of cocoons, producing 1,503,310 lbs. of silk, the greater part of which is coarse-spun, and may be valued at £1,500,000; whence it results that in the Venetian provinces the raw material acquires an increased value of £165,000, which, deducting expenses, gives the spinners a net profit of £45,000.

The Southern Tyrol, in 1855, possessed 184 large silk spinneries, besides smaller ones, with a total of 5,368 caldrons, employing 11,000 persons, and furnishing 348,390 lbs. of raw silk spun from 3,991,050 lbs. of cocoons. To make up the quantity of cocoons required beyond the production of the country, the Venetian provinces supplied about 550,000 lbs. The gross profits of the spinneries amounted to £20,500, and the value of the silk produced £2,291,350. The other provinces of the empire produce about 230,000 lbs.

The whole production, therefore, of raw silk in Austria amounts to 5,512,500 lbs., of the value of more than £5,250,000, and the number of persons employed in the spinneries is not less than 160,000.

The raw silk is subjected to a fresh process in the throwing-mills.

As the tables of Austrian Commerce for 1852 show that 770,000 lbs. were exported by way of Venice, Trieste, Switzerland, and the Italian States, whilst the importation only reached 228,150 lbs., it may be said that of the whole produce of the empire, as before stated, about 5,000,000 lbs. remain for home consumption; two-thirds of which are consumed in Lombardy.

In the province of Milan there are 93, and in the whole of Lombardy 525, throwing-mills, with 1,239,000 spindles; 700,000 for throwing, and the remainder for folding the silk, employing 12,000 persons, namely, 4,500 men,

5,500 women, and 2,000 girls, besides 30,000 bobbin-winders, who work also for the Venetian throwing-mills.

The total production amounts to 1,550,000 lbs. of tram, and 1,276,000 lbs. of organzine, or 2,826,000 lbs. of thrown silk, which at £1 3s. 9d. a lb. give a value of £3,355,870. To produce this quantity, 2,955.000 lbs. of raw silk are required, which calculated at £1 1s. 1d. a lb., amount to £3,100,000, whence it follows that an annual gross profit of about £320,000 is obtained by the throwing-mills in Lombardy.

The throwing-mills of the Venetian Provinces offer the same proportional results as the spinneries do; producing, however, a larger proportion of sewing-silk, of which Verona alone (though declined from its former importance in this respect), produces 265,000 lbs. annually.

About 1,320,000 lbs. of raw silk are consumed in the Veneto, producing 1,255,000 lbs. of thrown silk, worth about £1,190,000, reckoning the waste, and employing 18,000 persons, including bobbin-winders working out of the establishments.

The gross profit of the throwsters is about £102,000. Their labours increasing the value of the raw material to that amount.

In the Tyrol there are now 57 throwing mills, with 104,903 spindles, besides numerous smaller works, collectively employing 2,100 persons, and producing 335,000 lbs. of thrown silk of the value of £280,000 for which 347,600 lbs. of raw silk, costing £242,000, are consumed. Including the worth of the waste silk, a gross profit is obtained of £38,000.

In Austria, the ulterior labour of manufacturing thrown silk into silk stuffs, takes place almost exclusively at Vienna, Milan, and Como; a considerable quantity is also wrought up with other material, particularly wool, in the manufacture of damasks, tapestry, &c.; but the greater part of the thrown silk is exported either in a grey state or dyed.

This branch of manufactures is rapidly increasing in the capital of the empire, which alone consumes half of the whole quantity produced, and including the dyeing establishments, employs a capital of £1,200,000. From 1839 to 1852, the consumption of thrown silk, for weavers' use, increased in Vienna from 542,300 lbs. to 1,188,000 lbs.

Milan is next to Vienna in the importance of its manufactures of silk stuffs. Its productions amount annually to more than 325,000. Como, engaged only in the manufacture of plain stuffs, has a greater number of looms than Milan, and produces to the amount of about £260,000.

There are silk manufactories in the Italian Tyrol at Ala and Roveretto, and many in the Venetian Provinces, as well as numerous looms at Venice, Vicenza, and Verona, for velvets and ordinary silks. The value of the manufactures thence produced is estimated at about £165,000.

The amount of the silk manufactures, comprising articles made of waste silk and knubs, and stuffs of mixed material, cannot, therefore, be estimated at less than £2,400,000.

Summing up all these particulars, and bearing in mind the increased value which waste silk acquires by manufacture, as also the silk itself, after being dyed, it follows that the cultivation and manufacture of silk in Austria give a general total of 6¼ millions sterling, and support fully 800,000 individuals during the whole or part of the year.

GLASS AND GLASS BEAD MANUFACTORIES.—The glass manufactories of Venice, formerly so renowned, have long since lost their pre-eminence. When the general commerce of the Levant and Mediterranean forsook the Venetians, their manufactures declined. Having obtained a high perfection in that of glass, they became heedless of further improvement, and France, England, and Bohemia were enabled to obtain a superiority of which they are not likely to be deprived. The Venetians, however, still excel in making glass beads, which form one of the most important articles of their export trade, the amount annually manufactured being estimated at about £200,000. The attention of the manufacturers is particularly directed to the production of enamels, and of a counterfeit gem called "Avventurina," and common glass vessels are still made to a great extent for exportation to Greece and the Levant.

COAL AT VALDAGNA.—A mining company, established in Venice, in the year 1840, under the name of the "Società Montanistica," has successfully worked the coal-mines at Valdagna. In fourteen years these mines have furnished upwards of 150,000 tons of coal. As it serves every purpose (except for producing gas) in the manufactories and steam-mills, it has superseded English coal, which is now only used mixed in small proportions with the Valdagna.

MINING IN THE PROVINCE OF VENICE.—The neglect into which this industry has fallen may be attributed to the scarcity of firewood, caused by the destruction of the forests, to the want of practical and technical knowledge of mining, as well as to political and financial vicissitudes. A Company has lately been formed, called the "Lombardo-Venetian Company," for the carbonization of peat-turf, with a view to utilise the numerous pits of this fuel existing in the Province of Venice, and thus in some measure supply the deficiency of firewood.

COTTON GOODS.—A manufactory of cotton goods, containing 250 looms, has lately been attached to the spinning establishment at Pordenone, the productions of which tend to lessen the consumption of British goods. In Lombardy, 18,000 looms are employed in the manufacture of cotton, of which 16,000 are in the province of Milan. The spinneries and manufactories are increasing in importance.

COTTON.—The great staple of the commerce of the Bight of Benin is now palm-oil; ivory is the next article in value exported, and cotton, which is now being extensively cultivated around Abeakuta, forms the third. The readiness with which the inhabitants of the large town of Abeakuta have extended their cultivation of the cotton-plant, merits the favourable notice of the manufacturer—of the philanthropist—and, as a means of supplanting the slave trade, by its turning the attention of the native to the value of the soil and of human labour—of her Majesty's Government. The same difficulty which attended the first cultivation in the United States some seventy years since, is now experienced by the Abeakutan cultivators—the want of machines to clean it, and separate the seed from the fibre; in consequence of this difficulty, but a very small proportion of the cotton cultivated around Abeakuta has as yet been prepared for shipment.

TOBACCO AND AQUADIENTE.—From Bahia, in the Brazils, are imported large quantities of roll tobacco and aquadiente, principally in vessels under the flags of Sardinia and Portugal, the flag of Brazil being now rarely or never seen on this coast. It is difficult to ascertain the exact quantities of these two commodities sold in the Bight of Benin, as the Sardinian and Portuguese vessels laden with them usually strike the coast at the most windward or western fort on the gold coast, and then proceed eastward as far as Lagos; but it has been estimated that at least 3,500 rolls of tobacco and 2,000 pipes of aquadiente were imported in 1856; the value of the the former being six dollars the roll, and of the latter seventy dollars the pipe. Roll tobacco was formerly, and still is, the principal medium of payment for slaves. A large quantity is carried into the interior, and the ivory now finding its way to the sea coast is mostly purchased with that article.

THE REEF ROCKS OF PERNAMBUCO.—The province of Pernambuco lies betwixt the 3rd and 11th degrees of south latitude, and the 32nd and 40th degree of west ongitude, its extent of coast being upwards of 800 miles; its principal ports are Pernambuco, Paraiba, Maceio, Rio

Grande do Norte, Aracate and Ceara, and are all formed by that wonder of nature, the Recife, or reef of rocks, which not only traverses the whole coast of the Consulate, but extends itself for 1,500 miles from Maranham to the southward of Bahia. This reef is of such extreme geographical and commercial interest, that I shall commence this report with a description of it. In coming along the coast of Brazil, from the southward, it first appears near the small river Una, in the province of Bahia, a few miles south of the capital; thence it continues its unintercepted course for 1,500 miles to the capital of the province of Maranham; its average distance from the shore may be about half a mile, at some parts of the coast it runs on shore; at others, it is as much as seven miles out at sea, notwithstanding which exceptions, the regularity with which it follows every indentation of the shore is very remarkable; the nature of its geological formation has been much questioned; the generally received opinion is that it is the work of the Coralina; but this has been strongly denied by others, who declare it to be sandstone; I feel no doubt in my own mind that it belongs to the former system, for in those parts still beneath the surface of the water, I have myself gathered live white coral of the most picturesque description, and which may be obtained in any quantities; but when the reef rises to the surface, and the insects abandon their labour, nothing appears to me more reasonable than the conclusion that the interstices of their beautiful fabric become choked with sand and broken shells, which, in the lapse of time, are incorporated with it, and give it the appearance of a rough sandstone: when cut by the chisel, it has the appearance of conglomerate; however, whatever the formation may be, this wonderful work of nature is at once the protector of the land from the heavy swell of the broad Atlantic, and the creator of numberless harbours for the nurture and protection of the navigation of a commercial people.

Home Correspondence.

INTERNATIONAL EXHIBITION OF 1862.

SIR,—As the project for holding a great Industrial Exhibition in the year 1862 is likely to be carried into execution, it becomes all those who feel an interest in the movement to offer what assistance they can towards its successful accomplishment.

From the pages of the *Journal* it appears that some of our colonies have already taken up the matter, and have resolved to contribute collections that shall fully represent their industrial resources. The execution of this design would probably be assisted, and the resulting collections enhanced in interest and value, if suggestions derived from the Exhibitions of 1851 and 1855 were drawn up and communicated, through the *Journal*, to committees abroad.

It is with this view that I take the liberty to offer some remarks upon the pharmaceutical products, both raw and manufactured, which we may hope will figure in the collections of 1862, and upon their mode of exhibition and the information that should accompany them. If those interested in other subjects would, in like manner, draw up a few notes on points to which it is desirable to direct attention, I cannot but think that useful results would follow.

The remarks I have to offer will be best arranged under the respective heads of *Unmanufactured Drugs, Chemical and Pharmaceutical Products*, to which I will add a few observations on the *Manner of Exhibition* and *Catalogues*.

Unmanufactured Drugs.—Substances of this class are not very attractive objects to the general public, but they are often extremely interesting and instructive to the man of science, as well as to the manufacturer. In the London Exhibition of 1851 there was a considerable collection of such products, but a far finer at Paris in 1855. Specimens of raw drugs sent from foreign countries should be carefully packed, so that they may arrive in good condition; the great enemy to be guarded against being humidity, which occasions specimens to become mouldy. If sent from abroad, arrangements should be made for examining them upon their reaching London, for rejecting any that have become spoiled, and placing such as are in a state for exhibition in suitable jars or cases. Every parcel should be labelled in the fullest and clearest manner, and each series of specimens should be accompanied by a list, giving fuller particulars than can be stated on a wrapper. In the case of a drug that is but little known, it is desirable to have the native name, and the scientific name also, whenever the latter can be given upon undoubtedly good authority. As a general rule, the economic product is the only part of a plant which it is needful to exhibit, but there are cases in which it would be extremely desirable to procure such specimens as would illustrate the origin of such product, the method of obtaining it, &c. Thus, *Balsam of Tolu*, a production of New Granada, would be vastly more interesting if accompanied by pressed and dried specimens of the tree (now almost unknown) from which it is derived; and the same remark applies to Sarsaparilla, to Myrrh, to Gamboge, to Olibanum, and to numerous other drugs.

In the Paris Exhibition of 1855, there was a large collection of drugs from India, but unfortunately it was very ill-arranged. Many products, in fact, were never made accessible for exhibition at all, and could only be examined upon leave being obtained to open the bags containing them. Some specimens were placed in *stoneware* bottles, so that inspection was out of the question; while a vast number from Ceylon and from Java, Sumatra, and other islands of the Indian Archipelago, were destitute of intelligible labels, and wholly unarranged. It was also remarkable that the pharmaceutical raw products of some important countries were entirely unrepresented; and that while there were admirable collections from French colonies, such as Pondicherry and Bourbon, and from some of our own colonies, as Jamaica and Demerara, almost nothing was contributed by Brazil, our settlements in China, our possessions on the West Coast of Africa, the Island of Trinidad, &c.

Chemical and Pharmaceutical Products.—This is a class of articles the exhibition of which draws forth a far more competitive spirit than the last; and, considering the progress that manufacturing chemistry has made during the last few years, and the liberal character of our import duties, there cannot fail to be an ample display of contributions, both British and foreign. The experience of former Exhibitions does not suggest many remarks regarding this class of substances. I may, however, mention that enormous specimens of crystallised salts, such as the ferrocyanide of potassium, sulphate of copper, &c., shown in Paris in 1855, are less indicative of the goodness of the articles than of the expense and trouble of conveying them from the manufactory to the place of exhibition. Hydrochloric or sulphuric acids, in glass jars containing *gallons* (such as I saw in Paris in 1855), are also quite as efficiently represented by smaller samples. The excessive absurdity of an entire case filled with dozens of bottles of cod-liver oil, of one and the same sort, all properly sealed and labelled, and apparently ready for sale, need not be insisted on, and we may well wonder that such a display should be admitted. Specimens, again, which are exhibited chiefly from their beauty of appearance, and which are evidence of no special skill on the part of the manufacturer, should bring little credit to the exhibitor. Of how much greater scientific value was the series of Dr. Frankland's organic radicals in the Paris Exhibition, than the heaps of brilliant, iridescent bismuth that so plentifully decorated the cases of many of the French chemical manufacturers.

Manner of Exhibition.—Under this head I would say a few words regarding the bottles and other recepta

cles in which specimens should be placed. In the Paris Exhibition there were vessels of honour and vessels of dishonour,—stone bottles, utterly impervious to light, and vases so elaborately cut and gilt that their contents were hardly more perceptible. Of course such extremes should be avoided; moreover, bottles should not (except where essential for the preservation of the specimens) be hermetically closed, but should be fitted with such covers that the contents can be readily examined by those authorized to do so. Every specimen should be most clearly and legibly labelled; but even in this we may have an excess. I have seen a nice series of jars from one of our colonies, the contents of which were almost completely hidden by the amplitude of the paper labels pasted round the glass. Labels, indeed, should give their information briefly, fuller details being reserved for catalogues, of which I will now speak.

Catalogues.—These are very desirable for all considerable collections of raw materials. In the exhibitions of 1851 and 1855 there were several catalogues of particular departments, which could be had by those who felt interested to apply for them, though some, printed abroad, were difficult to obtain. The colonies of Algeria and British Guiana published very good catalogues, which may still be usefully referred to for information regarding the products of those countries in 1855. On the other hand, the products of Guatemala, New Granada, and Paraguay (and to some extent those of Mexico) were greatly shorn of interest from the impossibility of obtaining the information which well drawn-up lists would easily have afforded.

Apologizing for the length to which these remarks have extended.—I am, &c.,

DANIEL HANBURY.

Plough-court, Lombard-street, January 14, 1861.

MODERN HOSE.

SIR,—Dr. Wyld is exceedingly irate upon the use of shoddy, and repeats the arguments which have been frequently urged against the reconversion of substances for sale. But there are always two sides to a question; and while I have neither interest in the manufacture nor any desire to see waste materials used if the original raw material can be obtained in quantity to supply the demand, and at a price to meet the means of the masses, it is but fair that a few observations should be submitted in reply. The Divine command given on the question of food is, I think, equally applicable in the matter of clothing—that we should gather up the fragments that nothing be lost. This has been urged upon us of late strongly in the public journals, where we have been solicited to hunt out old worn and cast-off clothing for the use of the poor. A worn garment, a cheap pilot cloth, a railway rug, a thin blanket, are better than none at all. These are not, after all, such "diabolical shams" as the manufacture of only superior broad cloths at a price out of the range of millions to obtain. I presume I am the person pointed at by Dr. Wyld, as having cast a scandal on the Society in a paper which I read before the members. Now the paper was certainly not one "On Shoddy," for this was only incidentally alluded to among many other materials. My object was to inculcate thrift, a husbanding of resources, a utilization of waste products, and to show how skill and science, by reconversion, had turned to use many formerly neglected substances.

I do not remember that any of the members present "considered shoddy rather a good joke," whatever some of the minor articles, the collection and use of which I named, might have been deemed. Different eyes look upon the same subjects from a different point of view. No doubt everyone would desire to have the best article that is made; but this is not always possible, and cheapness is a failing with a very large class of purchasers, who thus complain of the inferiority of goods, expecting, forsooth, that the best fabrics are to be had for a low price. I am not an advocate or a supporter of adulterations of any kind, and, in the various publications with which I am connected, few have exposed more strongly those which militate against the health and due sustenance of the body. But, in this question of cheap woollen clothing, with the continued advance and scarcity of the raw material, it becomes a question of whether the poor shall have any woollen garments or none. I do not believe it touches the middle or upper classes of society. No respectable tailor, who is paid a good price for an over-coat or suit, would, I am sure, supply an inferior article. The poorer, or working classes, must, on the contrary, depend upon slop-made articles, for the main reason that the price comes within their means. But they are, for the most part, very good judges of fibres and material, and know full well what they are buying. The garments answer their purpose, even though they may be a mixture of half new and half old material, and the cloth sold at a price of 1s., 2s., 3s., or more a-yard, is within their means when that at 8s. or 10s. would not be.

It should be borne in mind that with the progress of population there is an increased demand for wool at home and abroad, and sheep husbandry scarcely keeps pace with the demand. The consumption of mutton is greater in Australia and the United Kingdom than it has been. The pecuniary means of the great bulk of the population are better than they were some years ago, and hence they are better customers for animal food and for clothing than they were. There is a greater dearth of labour in the pastoral districts of the colonies, owing to the attractions of mining, town labour, and mechanical operations. There is also a greater demand for wool in the United States and on the Continent. All these and other causes tend to restrict our supply of wool. The unusually severe weather, too, experienced during the winter and spring of 1860, caused a great falling off in the production of home-grown fleeces, and consequently led to an increased inquiry for all foreign wools that could in any way be adapted as substitutes, and as this deficiency in a very important item of our supply is likely to be again experienced in the coming season, it becomes a serious question how the demand is to be met, supposing consumption to progress at the present rate. A trade circular of one of the principal wool brokers thus speaks of the position of the wool market in the past year:—"There was an increase in the imports of wool, according to the official trade returns, of 10 per cent., from which must be deducted an increase in the exports of wool of 9 per cent., thus leaving a surplus of one per cent. only. Against this, however, there appears an increase in the exports of manufactured woollen goods and yarns of 8 per cent., which, added to the deficiency in the home growth of 15 per cent. last year, leaves the supply of wool 22 per cent. short of that of 1859."

The commercial treaty with France is calculated to give an additional stimulus to the exports of woollen fabrics, and to develop more particularly the resources of the carpet and worsted trades, and there will be a fresh outlet in China for English woollens; so that while there is at present a positive scarcity of most current descriptions of wool, there is a great fear of a further deficiency in sufficient supplies of the raw material. Dear coals and dear food are bad enough, and dear warm clothing will aggravate the evil. Anything, therefore, that can come to aid the supply for the masses, that will furnish warm garments, even though they be not so bright-looking, so fine, or so durable as might suit the taste and purse of our metropolitan physicians, will certainly be most acceptable to thousands, will come in to supplement our supplies of new wool, and give employment in the manufacture to a few thousand persons.

An addition of 5,000,000 or 6,000,000 lbs. of raw material, even though it be not of the first class, is no slight gain in a manufacturing or utilitarian point of view.

I have thus far dealt with the question of cloth, and I would now say a few words about stockings. I do not

think that the worsted of stockings is re-converted to the same use, however much it may be spun into yarn for cloth. The "garter" question I will pass by as irrelevant to the discussion. I very much doubt that Dr. Wyld's praiseworthy efforts to re-introduce hand-knitted stockings will be crowned with that measure of success, in a commercial point of view, which he anticipates. Machinery has made such inroads upon hand-labour in every department—knitting, weaving, spinning, or sewing—that competition with the power-loom seems almost futile, and successful competition as to price could not be carried on. It is even questionable whether the "good-fitting, good-wearing stocking" would, after all, find equal favour with the "rotten scarlet, purple, and other woollen hose," which Dr. Wyld deprecates. So dominant and capricious is fashion that the ladies will follow the lead, even "at the expense of the purses and tempers of fathers and mothers." As Mr. Thomas Dunn well states, "good stockings are to be had by paying a proper price for them."

In conclusion, may not the chemical action of some of the newly-invented dyes, on the worsted, have much to do with the rottenness alluded to?

Apologising for trespassing at such length,

I am, &c.,

P. L. SIMMONDS.

8, Winchester-street, S.W., Jan. 14.

COPYING PICTURES IN PICTURE GALLERIES.

SIR,—I had hoped that my last letter would have obviated the necessity of again trespassing on your space, but "S. R.," in his reply, persists in some of his mistakes. I will, after a few words of explanation, close my share of the correspondence.

Passing by the personal matter with which S. R. opens and concludes his letter, and coinciding with him that there must be some public capital laid out in the galleries for many things besides coals (a fact I never disputed), I come to paragraphs marked 2nd, 3rd, and 5th, (misprinted for 4th) and repeat that I adhere to my statements, which were made entirely from personal experience, and not from report of friends.

Regarding German art, if "S. R." will inquire among his artistic friends, they may perhaps induce him to retract his sweeping censure on the artists of Munich and Dresden. His instance of the arts in Italy suffering from the copyist needs no refutation—the cause of universal depression there being but too apparent.

But how about France and England, which he ingeniously forgets to mention, and where the "pernicious facilities," as he terms them, have so long existed? If his argument is good for anything, "modern art," in both countries, "exists only in the most degraded—most debased form."

If, as I willingly credit, "S. R." and others are agitating this question from a real desire to serve art, I would earnestly urge them to inquire more fully into the subject before committing the Society of Arts to a step which I firmly believe to be injurious to the cause which their position pledges them to support. I can confidently affirm that I have not made one statement that is not easily capable of proof, and must leave to others to say whether those of "S. R." are refuted or not. As no new arguments have been brought forward, I conclude that the case is stated, and shall, therefore, not trouble you more on the subject, but trust that the good sense of Parliament will reject the application unless grounded on better reasons than I have yet seen urged.

I am, &c.,

F. W. R.

Proceedings of Institutions.

RYDE LITERARY AND SCIENTIFIC INSTITUTE.—The annual general meeting was held on the 17th December. From the Committee's report it appeared that the receipts for the past year amounted to £168 7s. 11d.; the expenditure to £154 8s. 5d.; leaving a balance in hand of £13 19s. 6d. The number of pupils was stated to be 193. The Chairman congratulated the members on the prosperous state of the Institution.

WORCESTERSHIRE UNION OF EDUCATIONAL INSTITUTES.—The *Stroud Journal* says:—The meeting of delegates from the various Literary and Mechanics' Institutes of the Stroud district, to confer with a deputation from the above Union, was held at the subscription rooms, on Thursday, the 3rd January. Seven of the Institutes of the neighbourhood sent representatives, and after hearing the statement of James Tree, Esq., of Worcester, the deputation, three societies at once proposed to join the Union, the others only waiting the formal instructions of their committees before doing so. The advantages to Institutes connecting themselves with this association appear in brief to be,—that while each individual society in Union retains its full independence of action, they have collectively the advantage of an admirably arranged schedule of prizes annually given by the Union; a continual infusion of new matter into their libraries, by means of boxes of books purchased by the Union, and which pass from one society to another; assistance in the engagement of professional lecturers and the use of a large list of gratuitous lectures; the services of an experienced organising master for the formation and development of classes; and the mutual exchange of privileges amongst the whole of the members of societies in Union. There appears to be no doubt that the influence of this association will result in this county in a similar increase of efficiency in the affiliated societies, to that which, as shewn by the annual comparative report and tables, has followed its operations in Worcestershire. A hope was expressed that in case its operations are extended to this county, adequate subscriptions will be forthcoming from the friends of education, to enable it to cover as efficiently the larger sphere projected as it has hitherto done the one from which it derives its present name.

To Correspondents.

ERRATUM.—In last No. of *Journal*, p. 110, col. 1, line 31, for "progressive," read "aggressive."

MEETINGS FOR THE ENSUING WEEK.

MON. ...Brit. Architects, 8.
Medical, 8½. Mr. Henry Smith, "On the nature and treatment of the more severe forms of Stricture of the Urethra, especially when incision has been previously resorted to."
TUES. ...Royal Inst., 3. Prof. Owen, "On Fishes."
Civil Engineers, 8. Mr. Fred. Braithwaite, "On the Rise and Fall of the River Wandle."
Medical and Chirurg., 8½.
Zoological, 9.
WED. ...Roy. Soc. Literature, 4½.
Society of Arts, 8. Mr. Leonard Wray, "On Tea and its Production in various Countries."
Geological, 8. 1. Mr. J. D. Smithe, "On the Gravel and Boulders of the Punjab." 2. Mr. W. Whitaker, "On the 'Chalk-rock,' between the Lower and Upper Chalk, of Wilts, Berks, Oxon, &c." 3. Prof. Huxley, "On *Pterapis Dunensis* (*Palæoteuthis Dunensis*, Roemer)."
Archæological Assoc., 8½.
THURS...Royal Inst., 3. Prof. Tyndall, "On Electricity."
Philosophical Club, 6.
Numismatic, 7.
Philological, 8.
Royal, 8½.
Antiquaries, 8½.
FRI. .....Royal Inst., 8. Dr. G. C. Wallich, "On the Nature of the Deep sea Bed, and Presence of Animal Life at vast depths in the Ocean."
SAT. .....Royal Inst., 3. Dr. E. Frankland, "On Inorganic Chemistry."
Royal Botanic, 3½.

PATENT LAW AMENDMENT ACT.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[*From Gazette, January 11th*, 1861.]

Dated 5th December, 1860.

2982. C. W. Siemens, 3, Great George-street, Westminster—Imp. in fluid meters.

Dated 13th December, 1860.

3060. G. F. Chantrell, Liverpool—An improved draught generator. (A com.)

Dated 14th December, 1860.

3076. J. P. Baragwanath, 22, Castle-street, Falcon-square—Imp. in hydraulic punching apparatus. (A com.)

Dated 17th December, 1860.

3094. J. Morison, Paisley—Imp. in apparatus for spinning or twisting.
3098. A. Eddington, Springfield, Chelmsford—Imp. in draining ploughs.
3102. E. L. Morel, Paris—Imp. in ships' rudders, and the mode of mounting or applying the same to the stern-posts of vessels.

Dated 18th December, 1860.

3106. T. L. Preston and T. Lloyd, Birmingham—Imp. in the manufacture of metallic bedsteads, chairs, and couches, and other articles of like manufacture.
3110. C. L. Hancock, Pentonville—An improved fuel.
3112. J. Chesterman, Sheffield—Imp. in door and gate springs hinges, and centres, the improved springs being applicable to other purposes for which springs are employed.

Dated 19th December, 1860.

3114. W. Spence, 50, Chancery-lane—Imp. in apparatus for closing doors and keeping them closed. (A com.)
3116. R. J. Cole and M. Scarvell, Pembridge-gardens, Bayswater—Imp. in ornamenting or illuminating glass for decorative purposes.
3118. J. Brinkley, Carrickfergus, Antrim, Ireland—Imp. in furnaces for consuming or preventing the emission of smoke.
3120. R. A. Brooman, 166, Fleet-street—An imp. in irons for ironing. (A com.)
3122. J. Gilmore, Ramsgate—An improved method of raising water in baths.

Dated 20th December, 1860.

3124. W. Mossman, 1, Cleveland-terrace, Downham-road, Islington—The manufacture of bonnets from papered cloth.
3126. J. West, Kingstown, near Dublin—Imp. in apparatus for drying grain. (A com.)
3130. F. Schwann, Gresham-street—Imp. in dressing and stiffening fabrics and yarns, and in preparing and cementing the stiffening materials used.
3132. G. B. Rennie, Holland-street, Blackfriars—Imp. in machinery, apparatus and works of construction, intended to be employed, and the mode or method of using or employing the same for the purpose of examining or repairing ships and other vessels.
3134. E. Southam, Manchester—Imp. in machinery and apparatus for retarding and stopping railway trains.

Dated 21st December, 1860.

3138. J. Chatterton, Highbury-terrace, and W. Smith, Pownall-road, Dalston—Imp. in the manufacture of electric telegraph cables.
3140. J. Rigby, Suffolk-street, Dublin, and J. Needham, Piccadilly, Middlesex—Imp. in breech-loading fire-arms and cartridges.
3142. J. H. Johnson, 47, Lincoln's-inn-fields—Imp. in magneto electric machines. (A com.)

Dated 22nd December, 1860.

3146. E. Cook and J. Stokes, Birmingham—Imp. in sacking and joints for bedsteads.
3148. G. Sandys, Aldersgate-street—A novel instrument or apparatus for conveying signals or communicating intelligence, between railway stations and other distant points.
3150. W. Clark, 53, Chancery-lane—Imp. in the manufacture of colouring matters. (A com.)
3152. A. V. Newton, 66, Chancery-lane—Imp. in watches. (A com.)

Dated 28th December, 1860.

3177. G. H. Birkbeck, 34, Southampton-buildings, Chancery-lane—Imp. in furnaces for consuming smoke. (A com.)
3179. C. Binks, Parliament-street, Westminster—Imp. in manufacturing certain gases applicable in generating heat and light, and in bleaching.
3181. C. Pallu, Nogent-sur-Marne, near Paris—Imp. in the apparatuses and process for producing photographic pictures without working in dark rooms.
3183. A. V. Newton, 66, Chancery-lane—An imp. in breech-loading fire-arms. (A com.)

Dated 29th December, 1860.

3187. E. R. Burnham, Liverpool—Imp. in apparatus or machinery for stamping, shaping, or forming certain kinds of goods, manufactured of india rubber, gutta percha, and like substances.
3189. H. W. Viner, Penzance—Imp. in grand pianofortes.
3191. G. Davies, 1, Serle-street, Lincoln's-inn—Imp. in printing calicoes and other fabrics. (A com.)

INVENTION WITH COMPLETE SPECIFICATION FILED.

28. P. Courtais and F. Jammet, Port Vendres, France—Manufacturing of paper and pasteboard waterman.—5th January, 1861.

PATENTS SEALED.

[*From Gazette, January 11th*, 1861.]

January 11th.

1666. W. K. Hall.
1675. S. Povah.
1679. J. Askew.
1680. T. Brearley.
1682. H. Shaw.
1683. F. Ayckbourn.
1688. J. W. Edge.
1694. A. Strathern, A. Strathern, jun., and A. Strathern.
1695. C. G. Hill.
1696. W. Allen and W. Allen.
1703. J. and S. Lingford.
1710. L. Hope.
1721. J. Thiébaut.
1725. J. Henson & W. F. Henson.
1727. L. Unger.
1728. F. C. Seyde.
1734. A. C. Bamlett.
1735. D. Skekel.
1737. P. V. du Trembley and A. D. Martin.
1748. J. H. Johnson.
1749. I. N. Davis.
1758. J. Dickinson.
1816. A. Gélis.
1883. W. E. Newton.
1900. G. Jeffries.
1945. R. Smith.
2084. J. Wilson.
2219. F. Scheithauer.
2480. L. H. Rousseau.

[*From Gazette, January 15th*, 1861.]

January 15th.

1712. F. L. H. Danchell.
1726. J. Fletcher.
1742. R. A. Brooman.
1743. J. Hunt.
1750. A. B. Woodcock.
1754. J. Saxby.
1763. E. Hollis.
1770. W. Turner & J. W. Gibson.
1840. J. Ireland.
1890. W. Taylor, J. Pendlebury, T. Baily, and R. Harrell.
1990. R. Smith.
2124. H. Moore.
2166. J. Hamilton, jun.
2326. J. Haworth.
2676. C. Harratt.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

[*From Gazette, January 11th*, 1861.]

January 7th.

37. T. Greenwood and J. Batley.

January 9th.

42. J. A. M. Chaufour.
78. C. A. de Laire de la Brosse.

[*From Gazette, January 8th*, 1861.]

January 12th.

63. J. Stenson.
114. W. Clark.

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

[*From Gazette, January 11th*, 1861.]

January 7th.

70. M. Vetillart.

January 9th.

56. Rev. W. R. Bowditch.

LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

No. in the Registry.	Date of Registration.	Title.	Proprietors' Name.	Address.
4316	Dec. 14, 1860.	Drawers or Pantaloons	Henry Cutler	6, Conduit-street, W.
4317	,, 15, ,,	Ellis's Cramp Preventer and Invalid's Fender	Samuel Ellis	22, Summer-street, North, Dublin.
4318	,, 18, ,,	Slide Buckle for Braces	W. Blenkiron and Son	123, Wood-street, Cheapside, E.C.
4319	,, 20, ,,	Fire Guard	R. W. Winfield and Son	Birmingham.
4320	,, 20, ,,	A Design for both Scarf and Tie (The Garibaldi)	James Mellor	7, Chestergate, Macclesfield.
4321	,, 22, ,,	The Pillow Cap for Travellers	Walter Jessop	4, Royal-crescent, Cheltenham.
4322	,, 29, ,,	An Indestructible Snap Cap	Wm. Harnett Blanch	29, Gracechurch-street, E.C.
4323	Jan. 4, 1861.	A Portable Gun and Cartridge Case for a Breech-Loading Gun	Robert Bryant	13, Gt. Queen-street, Lincoln's-inn, W.C.
4324	,, 8, ,,	The Registered Ladies' Drawers	Sharp, Perrin and Co.	40, Old Change, E.C.
4325	,, 10, ,,	Canteen	Frederick Cox	Brick-kiln-street, Wolverhampton.
4326	,, 11, ,,	False Shirt Front	Welch, Margetson, and Co.	16 and 17, Cheapside, E.C.